

SEQUENCE LISTING

<110> McCool, Gabriel J.  
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Valentin, Henry E.  
Gruys, Kenneth J.

<120> POLYHYDROXYALKANOATE BIOSYNTHESIS ASSOCIATED PROTEINS  
AND CODING REGION IN BACILLUS MEGATERIUM

<130> MOBT212

<140> 60/115,092  
<141> 1999-01-07

<160> 29

<170> PatentIn Ver. 2.1

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<213> Bacillus megaterium

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<213> Bacillus megaterium

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<213> Bacillus megaterium

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Gln Trp Thr Leu Lys Ala Leu Glu Gln Gln Glu Phe Val Thr Lys  
35 40 45  
Ala Val Glu Gln Leu Gln Ala Thr Asp Lys Gln Trp Lys Ala Glu Leu  
50 55 60  
Glu Asp Leu Gln Gln Lys Thr Val Glu Asn Leu Arg Lys Thr Ala Gly  
65 70 75 80  
Asn Ala Val Ala Asp Ser Tyr Glu Glu Trp Thr Asn Arg Thr His Glu  
85 90 95  
Ala Leu Asn Lys Leu Gln Glu Leu Phe Phe Asn Gln Ser Lys Ser Ser  
100 105 110  
Tyr Ser Leu Val Lys Gln Ala Gln Glu Gln Tyr His Gln Val Val Thr  
115 120 125  
Gln Leu Val Glu Glu Gln Lys Lys Thr Arg Gln Glu Phe Gln His Val  
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Leu Ser Leu Arg Gly Trp Asn Leu His Gly Tyr Lys Leu Ile Gln Gln  
35 40 45

Leu Met Ser Phe Gly Phe Thr Ser Val Asp Gln Gly Asn Val Tyr Arg  
50 55 60

Thr Leu Arg Gln Leu Glu Lys Asp Asn Leu Ile Thr Ser Gln Trp Asp  
65 70 75 80

Thr Ser Ala Glu Gly Pro Ala Arg Arg Ile Tyr Ser Leu Thr Asp Ala  
85 90 95

Gly Glu Gln Tyr Leu Ser Met Trp Ala Asn Ser Leu Glu Gln Tyr Gln  
100 105 110

Asn Met Leu Asp Ser Phe Phe His Met Tyr Thr Asp Met Leu Phe Pro  
115 120 125

Phe Ser Ser Ser Ser Lys Lys Ser Lys Glu Ser Lys Glu Glu Glu  
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Asn Asp  
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<212> PRT  
<213> *Bacillus megaterium*

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20 25 30

His Gln Val Asn Val Pro Thr Lys Glu Asp Val Ala Asn Val Ala Ser  
35 40 45

Leu Val Ile Asn Val Glu Glu Lys Val Glu Leu Leu Glu Gln Phe  
50 55 60

Asp Asp Arg Phe Asp Glu Leu Glu Ala Gln Gln Glu Ser Ala Ser Ala  
65 70 75 80

Leu Lys Lys Asp Val Thr Lys Leu Lys Ser Asp Val Lys Ser Leu Asp  
85 90 95

Lys Lys Leu Asp Lys Val Leu Ser Leu Leu Glu Gly Gln Gln Lys Thr  
100 105 110

Gln Asp Glu Leu Lys Glu Thr Ile Gln Lys Gln Ile Lys Thr Gln Gly  
115 120 125

Glu Gln Leu Gln Ala Gln Leu Leu Glu Lys Gln Glu Lys Leu Ala Glu

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135

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Lys Thr Glu Gln Pro Ala Arg Lys  
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<211> 741

<212> DNA

<213> Bacillus megaterium

<400> 8

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<212> PRT

<213> Bacillus megaterium

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20 25 30

Val Ala Val Asn Tyr Asn Ser Ser Lys Glu Ser Ala Glu Ala Ile Val  
35 40 45

Lys Glu Ile Lys Asp Asn Gly Gly Glu Ala Ile Ala Val Gln Ala Asp  
50 55 60

Val Ser Tyr Val Asp Gln Ala Lys His Leu Ile Glu Glu Thr Lys Ala  
65 70 75 80

Ala Phe Gly Gln Leu Asp Ile Leu Val Asn Asn Ala Gly Ile Thr Arg  
85 90 95

Asp Arg Ser Phe Lys Lys Leu Gly Glu Glu Asp Trp Lys Lys Val Ile  
 100 105 110  
 Asp Val Asn Leu His Ser Val Tyr Asn Thr Thr Ser Ala Ala Leu Thr  
 115 120 125  
 His Leu Leu Glu Ser Glu Gly Gly Arg Val Ile Asn Ile Ser Ser Ile  
 130 135 140  
 Ile Gly Gln Ala Gly Gly Phe Gly Gln Thr Asn Tyr Ser Ala Ala Lys  
 145 150 155 160  
 Ala Gly Met Leu Gly Phe Thr Lys Ser Leu Ala Leu Glu Leu Ala Lys  
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 Thr Gly Val Thr Val Asn Ala Ile Cys Pro Gly Phe Ile Glu Thr Glu  
 180 185 190  
 Met Val Met Ala Ile Pro Glu Asp Val Arg Ala Lys Ile Val Ala Lys  
 195 200 205  
 Ile Pro Thr Arg Arg Leu Gly His Ala Glu Glu Ile Ala Arg Gly Val  
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 Val Tyr Leu Ala Lys Asp Gly Ala Tyr Ile Thr Gly Gln Gln Leu Asn  
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<212> PRT  
<213> *Bacillus megaterium*

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Ile Met Thr Thr Glu Ala Glu Pro Glu Val Gly Leu Thr Pro Lys Glu  
35 40 45  
  
Val Ile Trp Lys Lys Asn Lys Ala Lys Leu Tyr Arg Tyr Thr Pro Val  
50 55 60  
  
Lys Asp Asn Leu His Lys Thr Pro Ile Leu Leu Val Tyr Ala Leu Ile  
65 70 75 80  
  
Asn Lys Pro Tyr Ile Leu Asp Leu Thr Pro Gly Asn Ser Leu Val Glu  
85 90 95  
  
Tyr Leu Leu Asn Arg Gly Phe Asp Val Tyr Leu Leu Asp Trp Gly Thr  
100 105 110  
  
Pro Gly Leu Glu Asp Ser Asn Met Lys Leu Asp Asp Tyr Ile Val Asp  
115 120 125  
  
Tyr Ile Pro Lys Ala Ala Lys Lys Val Leu Arg Thr Ser Lys Ser Pro  
130 135 140  
  
Asp Leu Ser Val Leu Gly Tyr Cys Met Gly Gly Thr Met Thr Ser Ile  
145 150 155 160  
  
Phe Ala Ala Leu Asn Glu Asp Leu Pro Ile Lys Asn Leu Ile Phe Met  
165 170 175  
  
Thr Ser Pro Phe Asp Phe Ser Asp Thr Gly Leu Tyr Gly Ala Phe Leu  
180 185 190  
  
Asp Asp Arg Tyr Phe Asn Leu Asp Lys Ala Val Asp Thr Phe Gly Asn  
195 200 205  
  
Ile Pro Pro Glu Met Ile Asp Phe Gly Asn Lys Met Leu Lys Pro Ile  
210 215 220

Thr Asn Phe Tyr Gly Pro Tyr Val Thr Leu Val Asp Arg Ser Glu Asn  
225 230 235 240

Gln Arg Phe Val Glu Ser Trp Lys Leu Met Gln Lys Trp Val Ala Asp  
245 250 255

Gly Ile Pro Phe Ala Gly Glu Ala Tyr Arg Gln Trp Ile Arg Asp Phe  
260 265 270

Tyr Gln Gln Asn Lys Leu Ile Asn Gly Glu Leu Glu Val Arg Gly Arg  
275 280 285

Lys Val Asp Leu Lys Asn Ile Lys Ala Asn Ile Leu Asn Ile Ala Ala  
290 295 300

Ser Arg Asp His Ile Ala Met Pro His Gln Val Ala Ala Leu Met Asp  
305 310 315 320

Ala Val Ser Ser Glu Asp Lys Glu Tyr Lys Leu Leu Gln Thr Gly His  
325 330 335

Val Ser Val Val Phe Gly Pro Lys Ala Val Lys Glu Thr Tyr Pro Ser  
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Ile Gly Asp Trp Leu Glu Lys Arg Ser Lys  
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<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 12

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<210> 13

<211> 30

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:Synthetic

<400> 13

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<210> 14  
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<210> 15  
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<400> 15  
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<210> 16  
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<210> 17  
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<210> 18  
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1 5 10

<210> 22  
<211> 813  
<212> DNA  
<213> Bacillus megaterium

<400> 22  
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ggaattttgg cgccggataa tgctcttgt atggctatta tggtaaaaca ttaccggaa 120  
gaaaaacgcga agaaggcatt atttacgga ttagccggc ccttatttt tagattttgg 180  
tcgttgttct tgatttcatt tttagtcgac gtatggcagc ttcaagctat aggagccatt 240  
tacttattgt tcatttccat taatcatatt gtgaagcgat atgtaaaaaa agacgatcat 300  
gaaaaagtga aagaagcaga cgagaaaaag ggctcagggtt tctggatgac gttttaaaaa 360  
gtagaaaatag cagacattgc ttttgcgtt gattcaattt tggccgctgt ggctctcgcc 420  
gttacgttgc caacaacaaa tcttcctcaa attggcggac tcgacggcgg acaattcttgc 480  
gtgatcttcg ccggaggaat tatgggatta attattatgc gttttgctgc aacttggttc 540  
gtcaagctat taaatacgcg cccaggccta gaaacggcgg ctggctat tgtaggctgg 600  
gttaggagttt agttacgcgtt ctataccctt gtcatccag agtttaggtat tattaaatgaa 660  
catttccttg aatcaaaaatgt gtggaaaatt acgttttggaa ttgtgttact tggcatagct 720  
gcttcaggctt ggtttctatc taaaaataaa gaacaaaactg atcttgaagg ctcagagaaa 780  
gaaaaagaat cgtaaaaaaa aattgaaaat caa 813

<210> 23  
<211> 271  
<212> PRT  
<213> Bacillus megaterium

<400> 23

Met Asp Ala Ser Leu Leu Leu Glu Tyr Gly Trp Val Leu Leu Val Leu  
1 5 10 15

Val Ala Leu Glu Gly Ile Leu Ala Ala Asp Asn Ala Leu Val Met Ala  
20 25 30

Ile Met Val Lys His Leu Pro Glu Glu Lys Arg Lys Lys Ala Leu Phe  
35 40 45

Tyr Gly Leu Ala Gly Ala Phe Ile Phe Arg Phe Gly Ser Leu Phe Leu  
50 55 60

Ile Ser Phe Leu Val Asp Val Trp Gln Leu Gln Ala Ile Gly Ala Ile  
65 70 75 80

Tyr Leu Leu Phe Ile Ser Ile Asn His Ile Val Lys Arg Tyr Val Lys  
85 90 95

Lys Asp Asp His Glu Lys Val Lys Glu Ala Asp Glu Lys Lys Gly Ser  
100 105 110

Gly Phe Trp Met Thr Val Leu Lys Val Glu Ile Ala Asp Ile Ala Phe  
115 120 125

Ala Val Asp Ser Ile Leu Ala Ala Val Ala Leu Ala Val Thr Leu Pro  
130 135 140

Thr Thr Asn Leu Pro Gln Ile Gly Gly Leu Asp Gly Gly Gln Phe Leu  
145 150 155 160

Val Ile Phe Ala Gly Gly Ile Met Gly Leu Ile Ile Met Arg Phe Ala  
165 170 175

Ala Thr Trp Phe Val Lys Leu Leu Asn Thr Arg Pro Gly Leu Glu Thr  
180 185 190

Ala Ala Phe Ala Ile Val Gly Trp Val Gly Val Lys Leu Ala Val Tyr  
195 200 205

Thr Leu Ala His Pro Glu Leu Gly Ile Ile Asn Glu His Phe Pro Glu  
210 215 220

Ser Lys Val Trp Lys Ile Thr Phe Trp Ile Val Leu Leu Gly Ile Ala  
225 230 235 240

Ala Ser Gly Trp Phe Leu Ser Lys Asn Lys Glu Gln Thr Asp Leu Glu  
245 250 255

Gly Ser Glu Lys Glu Lys Glu Ser Leu Lys Lys Ile Glu Asn Gln  
260 265 270

<210> 24

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Cannon Application

<211> 708  
<212> DNA  
<213> *Bacillus megaterium*

<400> 24  
atgctcacaa aagttcaaac gcctccatcg cttgaaacgc ttgtactgac gattcagcaa 60  
ggggataaac aattacataa taaaatgatt caacaatata aaccgtttat tgctaaagtt 120  
gttcagctg tatgtaaacg ttatataagt gaagctgacg atgaatttag cattggctcg 180  
attgcattt aatgaagccat taaaattac acaatccaaa aaggacgatc tcttccttgc 240  
tttgcggAAC ttattattaa aagaagagta atcgactata ttgcggAAAAGA aaagcgaaat 300  
caaacgctgc tctataaccg aattgaaaat gaaggTTTA ttcaaggtaa ggtggAAAGG 360  
gatatatcgc tttctaacta taaaaggcaa agtggAACTT catatattca agagggAAATG 420  
acttattttt gtcaggcgct aaaattgttt aaattaactc ttgaagacat tattaacacg 480  
tctcctaaac ataaggatgc aaggggAAAT gcagtggaaag ttgcattttt tatcgtaat 540  
gaaaaagaat taaaagataa gctgtttt aagcggcagc ttccattcg ctggattgaa 600  
aaacatgtca aagtaagccg gaaaacaatt gaaagggAAACC gtaaatatata tatcgcgatg 660  
gttattatat tagcggggga ctacgtgtat taaaagact atattatg 708

<210> 25  
<211> 236  
<212> PRT  
<213> *Bacillus megaterium*

<400> 25  
Met Leu Thr Lys Val Gln Thr Pro Pro Ser Leu Glu Thr Leu Val Leu  
1 5 10 15  
Thr Ile Gln Gln Gly Asp Lys Gln Leu His Asn Glu Met Ile Gln Gln  
20 25 30  
Tyr Lys Pro Phe Ile Ala Lys Val Val Ser Ala Val Cys Lys Arg Tyr  
35 40 45  
Ile Ser Glu Ala Asp Asp Glu Phe Ser Ile Gly Leu Ile Ala Phe Asn  
50 55 60  
Glu Ala Ile Glu Asn Tyr Thr Ile Gln Lys Gly Arg Ser Leu Leu Ala  
65 70 75 80  
Phe Ala Glu Leu Ile Ile Lys Arg Arg Val Ile Asp Tyr Ile Arg Lys  
85 90 95  
Glu Lys Arg Asn Gln Thr Leu Leu Tyr Asn Arg Ile Glu Asn Glu Gly  
100 105 110  
Phe Ile Gln Gly Lys Val Glu Arg Asp Ile Ser Leu Ser Asn Tyr Lys  
115 120 125  
Arg Gln Ser Glu Thr Ser Tyr Ile Gln Glu Glu Met Thr Tyr Phe Cys  
130 135 140  
Gln Ala Leu Lys Leu Phe Lys Leu Thr Leu Glu Asp Ile Ile Asn Thr

145	150	155	160
Ser Pro Lys His Lys Asp Ala Arg Gly Asn Ala Val Glu Val Ala Ser			
	165	170	175
Phe Ile Val Asn Glu Lys Glu Leu Lys Asp Lys Leu Phe Leu Lys Arg			
	180	185	190
Gln Leu Pro Ile Arg Leu Ile Glu Lys His Val Lys Val Ser Arg Lys			
	195	200	205
Thr Ile Glu Arg Asn Arg Lys Tyr Ile Ile Ala Met Val Ile Ile Leu			
	210	215	220
Ala Gly Asp Tyr Val Tyr Leu Lys Asp Tyr Ile Met			
	225	230	235

<210> 26  
<211> 957  
<212> DNA  
<213> *Bacillus megaterium*

<400> 26  
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ttttacatag tggctgttac gcttgggtt ctattactta gtattccaga agctttaagg 120  
ccaggagcaa agtttagcatt tattgatcgc ttatttatttgc ggtagtgc ggttaagtgtt 180  
acagggctga cacctgtctc gactccagat acatttagta caacggctca ttttttactc 240  
gttttttattt ttcaaatacggtt gtttattttgtt gtaatgacac tcagttacatt tatttggatg 300  
attttaggtt aaaaaatcggtt tctgaaggaa cgtcagctca ttatgacgga ccataatcaa 360  
tcccgtttat caggatttagt tgatttgatg agaaaatattt tatttattat ttttgccatt 420  
gaacttagtttgcgcattat ttttaggtt cattttctcc gtttatttttc gagctggaca 480  
gatgcgtttt tgcatgggtt ctttgccttct gtcagtgctca caacaaatgc tggcttcgat 540  
attacaggat cttcattttat tccgtatgcc catgatttttc tcgtacaatgtt ggttaaccgtt 600  
attttaattt cgttggagc gattggatttccctgttattaa ttgaaatcaa gcactattttt 660  
ttaacattt aagataagcg taaatttcaa ttttcgctat ttacgaagct aacgactattt 720  
atgttttttc tgctgtttagg agggggaaaca atcttgatttcc ttgtgctaga gcatttcaggaa 780  
tttctagcag ataagtcttgc ggtatgaatcg tttttttatgc cgttttccaa atccgctgc 840  
acaaggagcg gaggagtgcc gaccatgaat attaatgagt tttcacttcc tacgttaattt 900  
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<210> 27  
<211> 319  
<212> PRT  
<213> Bacillus megaterium
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<400> 27  
Met Pro Gln Pro Trp Lys Arg Arg Val Arg Gln Met Ser Ser Ala Gln  
1 5 10 15

Ile Ile Val Thr Phe Tyr Ile Val Ala Val Thr Leu Gly Phe Leu Leu  
                   20                  25                  30

Leu Ser Ile Pro Glu Ala Leu Arg Pro Gly Ala Lys Leu Ala Phe Ile  
35 40 45

Asp Arg Leu Phe Ile Ala Val Ser Ala Val Ser Val Thr Gly Leu Thr  
50 55 60

Pro Val Ser Thr Pro Asp Thr Phe Ser Thr Thr Gly Tyr Phe Leu Leu  
65 70 75 80

Val Phe Ile Phe Gln Ile Gly Gly Ile Gly Val Met Thr Leu Ser Thr  
85 90 95

Phe Ile Trp Met Ile Leu Gly Lys Lys Ile Gly Leu Lys Glu Arg Gln  
100 105 110

Leu Ile Met Thr Asp His Asn Gln Ser Arg Leu Ser Gly Leu Val Asp  
115 120 125

Leu Met Arg Asn Ile Leu Phe Ile Ile Phe Ala Ile Glu Leu Val Gly  
130 135 140

Ala Ile Ile Leu Gly Leu His Phe Leu Arg Tyr Tyr Ser Ser Trp Thr  
145 150 155 160

Asp Ala Phe Leu His Gly Phe Phe Ala Ser Val Ser Ala Thr Thr Asn  
165 170 175

Ala Gly Phe Asp Ile Thr Gly Ser Ser Phe Ile Pro Tyr Ala His Asp  
180 185 190

Tyr Phe Val Gln Val Val Thr Val Ile Leu Ile Thr Leu Gly Ala Ile  
195 200 205

Gly Phe Pro Val Leu Ile Glu Ile Lys His Tyr Phe Leu Thr Phe Lys  
210 215 220

Asp Lys Arg Lys Phe Gln Phe Ser Leu Phe Thr Lys Leu Thr Thr Ile  
225 230 235 240

Met Phe Phe Leu Leu Leu Gly Gly Thr Ile Leu Ile Leu Val Leu  
245 250 255

Glu His Ser Gly Phe Leu Ala Asp Lys Ser Trp Asp Glu Ser Phe Phe  
260 265 270

Tyr Ala Phe Phe Gln Ser Ala Ala Thr Arg Ser Gly Gly Val Ala Thr  
275 280 285

Met Asn Ile Asn Glu Phe Ser Leu Pro Thr Leu Ile Met Met Ser Ala  
290 295 300

Met Met Phe Ile Gly Ala Ser Pro Ser Ser Val Gly Gly Gly Ile

305

310

315

<210> 28  
<211> 195  
<212> DNA  
<213> *Bacillus megaterium*

<400> 28  
atggctagaa caaataaaact attaacacca ggagtagaaac aatttttaga tcaatataaa 60  
tatgaaatcg ctcagaatt tgggttaact ctagttctg acactgctgc acgcagcaac 120  
ggttcagtag gcggagaaat cacaacacgc ttggtgcaac aagctcaagc tcacttaagc 180  
ggcagcacac aaaaa 195

<210> 29  
<211> 65  
<212> PRT  
<213> *Bacillus megaterium*

<400> 29  
Met Ala Arg Thr Asn Lys Leu Leu Thr Pro Gly Val Glu Gln Phe Leu  
1 5 10 15  
Asp Gln Tyr Lys Tyr Glu Ile Ala Gln Glu Phe Gly Val Thr Leu Gly  
20 25 30  
Ser Asp Thr Ala Ala Arg Ser Asn Gly Ser Val Gly Glu Ile Thr  
35 40 45  
Lys Arg Leu Val Gln Gln Ala Gln Ala His Leu Ser Gly Ser Thr Gln  
50 55 60  
Lys  
65